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A NEW MARSUPIAL FROM THE EOCENE OF PATAGONIA[1]

BY GEORGE GAYLORD SIMPSON

In preparing a collection principally of bird bones made in Patagonia by the First Scarritt Expedition, there was recently found in the matrix a small mammalian jaw. Imperfect as it is, this specimen proves to be identifiable and to represent a new, unexpected, and important element in the Eocene fauna of South America.

The deposit from which this comes is an exposure of green bentonite, in the Casamayor Formation, in Cañadón Hondo, Chubut, Argentina, a remarkable fossil pocket only a few feet in diameter but rich in bones of highly varied character. The facies is unlike anything otherwise known in South America, all the fossils found in it appear to be new, and with a single exception none of the species, or probably genera, has ever been found except in this one minute spot in central Patagonia.

The fossils belong to four different vertebrate classes, including an anurous amphibian (being studied by Dr. G. K. Noble), two very unusual reptiles (*Sebecus* and *Crossochelys*, see Simpson, 1937), many but probably not highly varied bird bones (being studied by Dr. A. Wetmore), and the mammal described in this paper.

The accompanying illustration was drawn by Mr. John C. Germann, and I again have to thank Mr. Albert Thomson for his great skill in preparation. In this case he actually found the specimen, as well as prepared it, for it was collected accidentally in a block of matrix surrounding other and much larger bones and would never have been seen did he not work with such care.

COÖNA,[2] NEW GENUS

TYPE.—*C. pattersoni*, new species.

DISTRIBUTION.—Casamayor Formation, Eocene, Patagonia.

DIAGNOSIS.—Small didelphids with lower jaw and dentition of generally didelphine aspect. P_3 (alveoli) about as large as M_1. M_3 (probably also $_{1-2}$) with talonid markedly wider than trigonid, paraconid slightly higher than entoconid, metaconid

[1] Publications of the Scarritt Expeditions, No. 31.

[2] *Koona* (*fide* Musters), *cōne* (Schmid), or *coōna* (alternative transcription of indicated root), "stream" in the Tehuelche (Patagonian) language, in allusion to the evidently fluviatile or palustral associations of the type.

intermediate between paraconid and protoconid, trigonid moderately elevated and not compressed, hypoconulid very small, nearly internal, near entoconid. Talonid of M_4 as wide as trigonid or slightly wider and of about the same area, fully basined and closely similar to that of M_3, with three quite distinct cusps, the hypoconulid not enlarged or produced but about as on M_3. M_4 as a whole smaller than M_3.

Coöna pattersoni,[1] new species

TYPE.—Amer. Mus. No. 28907, right lower jaw with alveoli of P_4–M_2, whole crown of M_3, and M_4 with trigonid broken. Collected by C. S. Williams and G. G. Simpson, March 1931.

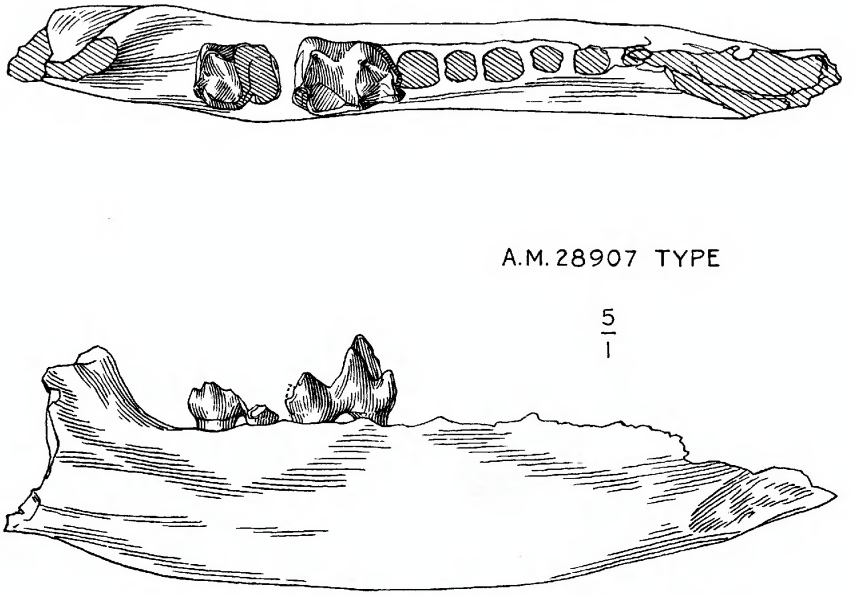

Fig. 1.—*Coöna pattersoni*, new genus and species. Type, Amer. Mus. No. 28907, left lower jaw with M_3 and talonid of M_4. Crown and internal views. Five times natural size.

HORIZON AND LOCALITY.—Casamayor, green bentonite series at type locality of *Sebecus icaeorhinus*, *Crossochelys corniger*, etc., in Cañadón Hondo, Chubut, Argentina.

DIAGNOSIS.—Sole known species of *Coöna*.

The alveoli show that P_3 was about as long as M_1 and nearly as wide. M_1–M_3 were progressively larger, and M_4 abruptly smaller, perhaps about the size of M_1. The posterior alveoli of M_{1-2} are noticeably larger than the anterior, and the preserved crown of M_3 shows the reflection of this in the wide talonid. As in most didelphids, this tooth has oblique

[1] Bryan Patterson, in recognition of his fine work on South American fossil mammals.

anterior and posterior cingula, the latter running into the hypoconulid. The other dental characters are adequately represented in the diagnosis and the figure.

The jaw is slender, simple, and much as in other small didelphids. The long, open symphysis reaches nearly to the anterior end of P_3. There is a mental foramen beneath the posterior root of M_1. On the outer side of the ramus beneath M_3 there is a prominent oblique groove, evidently pathological or a postmortem injury.

Didelphids, although forming a very small fraction of the collections, are well represented in various South American faunas from the Colhué-Huapí Formation (probably latest Oligocene) to the recent. Before the Colhué-Huapí the only records have been *Ideodelphys microscopicus* Ameghino and *Proteodidelphys praecursor* Ameghino, each represented only by a single specimen.[1] The latter was supposed to be from the Cretaceous "areniscas abigarradas" but I have elsewhere shown (Simpson, 1932) that there is no credible evidence of this, that the specimen is morphologically indistinguishable from mid-Tertiary forms, and that everything suggests that it is, in fact, from the mid-Tertiary.[2] In any case it cannot be accepted as of greater age and should, lacking any confirmation, be omitted from considerations of marsupial history.

Ideodelphys is unquestionably from the Casamayor and has therefore been the oldest South American didelphid of believable record. Unfortunately it is practically unidentifiable, being based on a broken jaw without any teeth. It is possible or indeed probable that this jaw did belong to a didelphid but the light that it casts on the history of that group is negligible, to say the least. Even if it were known positively to belong in the Didelphidae, its affinities within the family are beyond conjecture. Since its minute jaw is much smaller than that of *Coöna pattersoni* and since the alveoli have quite different proportions it is certain that the species are distinct and all but certain that the genera are.[3]

Coöna is thus really the only definable South American didelphid known to be from beds older than the Colhué-Huapí. Its most surprising and important characteristic is that it is definitely not a member of

[1] We have a second specimen of *Ideodelphys* but it adds nothing to what was known from the type.

[2] It was not found by Carlos Ameghino, who would not have made such an error, but by a worker whose field data are not reliable. Scott (1937) has recently compromised the argument by assigning the specimen to the Río Chico, which is practically impossible, or at least is contrary to all the evidence and claims on either side.

[3] In any case there would be no excuse for referring our species to *Ideodelphys* simply because it cannot be absolutely proved not to belong to it—in that case all opossums described since 1902 would have to be referred to *Ideodelphys* since none of them can be rigidly proved not to belong to it. *Ideodelphys* is what I call a *nomen vanum*, that is, it is not technically a *nomen nudum* and in general complies with the artificial requirements of the International Rules, but in practice it is quite valueless and is simply a nuisance because the genus never has, in fact, been distinguished, cannot be at present, and probably never will be.

the Microbiotheriinae, the subfamily to which all the other defined South American didelphids older than the Pliocene belong. As I have elsewhere pointed out (Simpson, 1935), M_4 of the microbiotheres is very distinctive because it is markedly reduced in size and has a very narrow, nearly unbasined heel, with only one really distinct, posteromedian cusp. M_4 of *Coöna* not only does not have these talonid characters, but also suggests an even greater difference from them than is seen in the Didelphinae, for instance, because the latter do commonly have the talonid of M_4 narrower than the trigonid and with a relatively large and posteromedian hypoconulid. The microbiotheres also appear usually or always to have the hypoconulid of M_3 (and the more anterior molars) more median than in *Coöna* and more coördinate with the hypoconid and entoconid as an element of the talonid rim.

In a general way *Coöna* compares rather with the Cretaceous Pediomyinae and the earlier Tertiary Didelphinae of North America than with the Microbiotheriinae. I am not, however, acquainted with any pediomyine that has exactly the structure and proportions of M_3 seen in *Coöna* nor with any pediomyine or didelphine that is known to have a closely similar M_4. *Peradectes elegans*, a didelphine from the Tiffany, Upper Paleocene, of North America seems to compare as closely with *Coöna pattersoni* as does any other previously known form. Its M_3 is very similar, differing only in minute details of doubtful value, such as the facts that the entoconid does not so nearly reach the height of the paraconid and that the disparity in width between trigonid and talonid is less marked. The talonid of M_4 is, however, definitely unlike that of *Coöna* and more like that of the later true didelphines, being somewhat elongate, narrower, and with a projecting hypoconulid which is the highest talonid cusp.

As hitherto known, the most probable interpretation of the history of the modern opossums has been as follows. In the Cretaceous of North America (and very likely also on other continents, although not yet discovered elsewhere) opossums were very abundant and extraordinarily varied. Probably from one group of these, the relatively unspecialized Pediomyinae, arose the didelphine stock, also varied as regards very minor characters but extraordinarily unprogressive and stereotyped in basic morphology. These occurred in the older Tertiary in Europe, but died out there in the Miocene. In North America they are known from the Paleocene to the Miocene and again in the Pleistocene and Recent. It is probable that their apparent absence toward the end of the Tertiary is merely caused by non-discovery, that they lived

in North America continuously, and that the living genus *Didelphis* was autochthonous here. In South America the known Middle Tertiary forms are microbiotheres and could not be ancestral to the living South or North American opossums. Opossums of recent type appear with apparent suddenness in the later Tertiary of South America and it seemed probable that they were invaders from the North American didelphine stock, making entry in advance of the major wave of continental intermigration.

As regards *Coöna*, three possibilities are worthy of special consideration:

1.—that it is an ancestral microbiothere, these animals becoming typically developed only toward the middle Tertiary;

2.—that it is an ancestral didelphine and that these modern opossums did develop in South America instead of or as well as in North America despite their non-discovery in the Middle Tertiary, which after all, is represented only by faunas very limited facially and geographically; or

3.—that it is simply another offshoot of the generalized opossum-like, perhaps pediomyine, stock that must have entered South America sometime before the Eocene, and represents an extinct minor phylum ancestral neither to microbiotheres nor to recent didelphines.

This one specimen, so incomplete and so vastly isolated in space and in time, certainly can make possible no definite choice between these alternatives, and any one of them remains possible. Such as it is, however, the evidence favors the third view. As noted above, the known peculiarities of *Coöna* hint at a trend rather away from than toward the microbiotheres. Although it is, in the known parts, rather more didelphine- than microbiothere-like, it seems in these parts to be slightly less fit morphologically as an ancestor of living opossums than are contemporary and older North American forms.

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